

MAY 18 2004

## Statement at the DOE Carbon Sequestration town meeting in Columbus

Mike Mudd

I wish to speak out in support of the Department of Energy's R&D program to develop technologies that can reduce CO2 emissions in a cost-effective manner. As high gasoline and natural gas prices dominate our headlines, we are reminded how much we depend on the availability of fossil fuels and how much energy prices impact our daily lives

With respect to electricity, we are facing difficult challenges:

- CO2 concentrations in the atmosphere need to be stabilized in the long term.
- Technology does not currently exist to remove CO2 emissions from coal-based power plants in an economical manner
- The permanent and safe sequestration of carbon dioxide in geologic formations is not proven as a cost-effective mitigation option for carbon abatement
- Coal, our country's and our state's most abundant fossil fuel, must remain a significant source of fuel for our nation's power plants if we want to ensure a secure, reliable, and affordable source of electricity for the future.

I have heard many analysis's state that it is acceptable to replace coal for electric power generation with natural gas in order to reduce carbon and other emissions, and that importing Liquid Natural Gas will ease the supply and therefore the price pressures currently being experienced. To those analysis's, I say that I do not want to set up a situation where the fuel for our electricity supply becomes dependent on imported natural gas and we leave a legacy to our children where they would be held hostage to a foreign cartel of natural gas suppliers so that we can keep our electric power plants running, in the manner that we all are now held hostage to OPEC for our gasoline supply to keep our automobiles running. (This is a fairly long and convoluted sentence. I just you break it up into two sentences.)

I, therefore, congratulate the Department of Energy in recognizing the importance of, and supporting meaningful R&D in the very important area of carbon capture and sequestration. I believe that the FutureGen Program is an important element of the DOE's efforts to develop and prove cutting-edge technologies that will ensure that coal can be compatible with the need to reduce CO2 emissions. I encourage attendees at this meeting to take the time to understand this important issue so that we can all work together: industry, the public, and the government to ensure a future of using coal, our nation's (and Ohio's) most important and low-cost fuel resource, in a clean, secure, and environmentally sound manner.

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~~Ad~~  
MANAGER, GENERAL TECHNOLOGIES  
AMERICAN ELECTRIC POWER

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**COMMENTS OF  
JACQUELINE F. BIRD  
OHIO COAL DEVELOPMENT OFFICE  
OHIO AIR QUALITY DEVELOPEMNT ATHORITY  
BEFORE  
USDOE'S PUBLIC HEARING ON  
NETL'S CARBON SEQUESTRATION PROGRAM  
MAY 18, 2004**

Good evening and thank you for the opportunity to comment upon USDOE's Carbon Sequestration Program.

My name is Jackie Bird, and I am the Director of the State of Ohio's Coal Development Office (OCDO), which is a part of the Air Quality Development Authority.

OCDO was created nearly 20 years ago to support coal research, development and especially deployment of the technologies and processes proceeding from them. Its purposes are multifold and mutually inclusive. Very briefly, this includes improving the efficiency and environmental performance of coal-based electric power generation, thereby holding the line on power costs, maintaining the use of Ohio coal and the jobs associated with its production and use, and improving both the economy--via reasonable electric rates--and the environment.

As you know, coal R&D is—among other things—very much an environmental program. I know I preach to the choir when I note that coal will be used in this state and this nation—in fact, the world—for

several decades to come. Therefore, it is incumbent upon us to develop methods to use this indigenous, secure resource in an environmentally sound manner. Most recently, more and more policy is moving in the direction of including the reduction of carbon dioxide emissions as a matter of concern.

No matter where one stands in this debate, if technologists and scientists are to be ready when the discussions are over, they must begin the research *post haste* in order to have viable answers in a relatively short time frame. Of all the nuts we've been challenged to crack over the years (SO<sub>2</sub>, NO<sub>x</sub>, PM<sub>2.5</sub>, mercury, etc.), CO<sub>2</sub> will by far be the most challenging.

Ohio is frequently pointed to as part of the problem when emissions from coal-based plants are discussed. What is seldom pointed out is that Ohio is also part of the solution, and has over the last two decades put its money where its mouth is and supported one of the largest state coal R&D programs in the nation, and along the way engaged in many fruitful project partnerships with USDOE.

Ohio is proud to be in the vanguard again. Over the last several years, Ohio has co-sponsored 27 CO<sub>2</sub> R&D projects, ranging from lab to field efforts. Ohio has committed nearly \$3 million (MM) towards these efforts. I am pleased to note that USDOE has partnered with us on several of these, contributing a similar amount (\$3.4 MM). The grantees have added another approximately \$2.2MM.

With this backdrop, OCDO wishes to note that it supports the concepts of USDOE's carbon sequestration program, and urges USDOE to proceed.

A few generic comments:

- Since CO<sub>2</sub> is a global issue, it is quite appropriate that an international venue such as the Carbon Sequestration Leadership Forum be pursued. There will not be true success of anything developed from this RD&D program until it is deployed many times over not just in the US, but throughout the world. A venue for the world to participate and contribute is most appropriate.
- Each region of the US has its own generic advantages and disadvantages regarding CO<sub>2</sub> sequestration. For this reason, OCDO supports the concept of the Regional Partnerships. OCDO is also proud to note that it is a significant co-funder of the Midwest Carbon Sequestration Partnership, one of seven such partnerships selected last year by USDOE. The MWRCSP is the largest and most ambitious of the seven. We expect good things to come from this, which should concomitantly serve to lay a good basis for some of the issues associated with the proposed FutureGen plant.

- Yes, OCDO supports the concept of a full-scale sequestration demonstration project that will capture and store carbon emissions—among other goals—which is known as the FutureGen program. In fact, we endorse it to such an extent that Ohio is enthusiastically supporting the siting of the prototype FutureGen plant in Ohio. Ohio has all of the advantages such a program requires: the coal, the geology, the water ways and <sup>water</sup>resources, the bulk materials transportation infrastructure, a second-to-none workforce, a university system with a very strong coal R&D expertise, the nation's (which means *de facto* the world's) best power siting process, a state EPA familiar with coal plants, state programs devoted to coal R&D and clean air, and the ability to offer both funding and tax incentives for such a project. We support the concept of a FutureGen plant, and we support its becoming a reality through its siting here in Ohio.
- USDOE is correct that there is seldom a “silver bullet” for a matter as dynamic as CO2 sequestration, and therefore we support a Carbon Sequestration Core R&D Program that will develop a portfolio of technologies for different techniques such as terrestrial, geologic and oceanic sequestration. Obviously, from Ohio's point of view, we are most interested in the first of these.
- However, we do inject a few notes of caution.

- --While Ohio supports all of the above, it also strongly reiterates the need for USDOE's basic coal R&D program. Many of the antecedents to FutureGen are presently found in the base coal R&D program. One example is the Ultra Super Critical Materials Consortium, which OCDO is co-funding along with USDOE. These pieces of research are absolutely necessary for the eventual success and deployment of a FutureGen plant. Do not budgetarily "rob Peter to pay Paul." Gutting funds from the base coal R&D program to fund FutureGen is counterproductive. One cannot expect to succeed in college if he's not learned his necessary lessons in Grades 1-12.
- --Remember the existing coal fleet. It is not going away anytime soon, and it still has issues that need to be addressed. Some funding should be allocated for concerns associated with combustion facilities.
- --Remember the smaller units. We are getting an increasing number of calls from smaller generators who want to environmentally upgrade the mid- and small-sized units. Interestingly, with the increasing up tick in the price of natural gas, we are also getting interest in those who would like to go back to coal. Consider them in your overall program as well.

Thank you for your time and attention to these comments.



**U.S. Department of Energy Hearing  
Midwest Regional Carbon Sequestration Program  
May 18, 2004**

**Elizabeth Shaw  
Manager, Energy Supply Technologies  
FirstEnergy Corp.  
76 South Main Street  
Akron, OH 44308  
(330) 761-4481**

Good evening. My name is Elizabeth Shaw, and I am Manager of Energy Supply Technologies for FirstEnergy Corp. FirstEnergy is a member of the Midwest Regional Carbon Sequestration Program coordinated by Battelle Memorial Institute.

Global climate change is an issue that is receiving increasing attention in recent years, and I appreciate the opportunity to share some thoughts with you on this important topic.

At FirstEnergy, we own and operate 20 power plants with a combined capacity of some 13,300 megawatts of electricity.

Of that, approximately 55 percent is coal, 28 percent nuclear, 12 percent natural gas or oil, and 5 percent pumped-storage hydro.

Since passage of the Clean Air Act, we have spent more than \$5 billion on pollution controls and environmental systems. And these investments have resulted in significant emission reductions.

Since 1990 alone, we've reduced emissions of sulfur dioxide and nitrogen oxides by more than 50 percent. And, we're committed to doing more.

Our diversified generation portfolio provides flexibility in meeting increasingly stringent environmental regulations. However, we still rely on base-load, coal-fired generation to meet our customers growing need for electricity.

In Ohio, reliance on coal is even greater, with more than 80 percent of the state's electricity being produced by coal-fired power plants.

**While we support efforts to reduce carbon dioxide and other greenhouse-gas emissions, we believe this issue requires a comprehensive strategy that includes thorough economic, scientific and environmental review.**

**Achieving meaningful reductions of carbon dioxide will require a combined approach, including:**

- **Cost-effective control technologies**
- **Increased fuel efficiency**
- **New lower-emitting and renewable sources**
- **Advanced electro-technologies**
- **Terrestrial sequestration through tree planting and other land management efforts**
- **Geological sequestration, and**
- **A market-based trading program**

**We support the U.S. Department of Energy's efforts to understand the potential benefits and costs of carbon capture and sequestration, which will be an important part of any meaningful reduction strategy.**

**Through our participation in the Midwest Regional Carbon Sequestration Program, we hope to gain a fuller understanding of the challenges and opportunities for reducing emissions of greenhouse gases.**

**This research will be key to developing a global climate change policy that achieves the desired environmental goals while maintaining the nation's supply of reliable, affordable electricity.**

**We believe that policies designed to address global climate change should:**

- **Provide flexibility in meeting emission reduction goals**

- Include reasonable compliance schedules to encourage the development of realistic, cost-effective control technologies and energy-efficient electro-technologies
- Be applied across a broad geographic region, recognizing that climate change is a global issue
- Provide incentives for technological developments
- Recognize and allow registration of actions already taken

We've already taken steps to reduce CO<sub>2</sub> emissions per megawatt-hour of electricity by retiring older coal-fired boilers and adding new, lower-emitting natural gas units to our portfolio.

And, we've signed long-term agreements to purchase the output of nearly 100 megawatts of wind power. We're looking to increase that to approximately 300 megawatts in the future.

Under the U.S. EPA's SF<sub>6</sub> Reduction Partnership, we've voluntarily reduced emissions of SF<sub>6</sub> by nearly 12 tons since 1998. That's the equivalent of nearly 300,000 tons of CO<sub>2</sub>.

We participate in the US DOE Global Climate Challenge program, and through this program have agreed to voluntarily reduce, sequester or avoid emissions of greenhouse gases.

As a result, we have reduced CO<sub>2</sub> emissions by nearly 12 million tons in 2002 alone and a total of more than 98 million tons since 1991.

And, we're involved in the Edison Electric Institute's Power Partnership through funding of its ForestTree, Combustion Products Reuse and Abandoned Mine Land Restoration projects.

While all of these initiatives will build on our progress to reduce greenhouse gas emissions, it will take advancements in carbon capture and sequestration, energy-efficiency, lower-emitting sources, and electro-technologies to achieve the kinds of large-scale reductions we've seen with SO<sub>2</sub>, and NO<sub>x</sub>.

We encourage the Department of Energy to continue its work to develop cost-effective, commercially ready and environmentally sound technology options to reduce greenhouse gases. We believe that major technological advances are needed to achieve the goal of stabilizing CO<sub>2</sub> levels. The concerted, collaborative efforts of the DOE and other stakeholders are vital to meeting the goal.

The Programmatic Environmental Impact Statement is an important part of the DOE process and we encourage a thorough and balanced review of the issues. We have reviewed the environmental issues listed in the Federal Register Notice of Intent for the PEIS and agree that they are important and should be considered. We recommend that the PEIS also include the potential socioeconomic impacts of the increased cost of energy as a result of CO<sub>2</sub> capture and sequestration.

We are confident that a reasonable climate change policy – one that includes thorough economic, scientific and environmental review – can be achieved through the type of public-private partnerships that the Department of Energy has initiated with its carbon sequestration program.

Thank you for the opportunity to be here today. We look forward to working together in the future on this issue.

**Comments  
Before the  
U.S. Department of Energy  
Relating to the  
Department's Carbon Sequestration Program.**

**May 18, 2004  
Columbus, OHIO**

Thank you for the opportunity to provide comments tonight on the issue of carbon sequestration.

My name is Klaus Lambeck. I am Chief of the Public Utilities Division of Facilities, Siting and Environmental Analysis and I am a Staff member of the Ohio Power Siting Board.

The issue before us, Carbon Sequestration, just like a kaleidoscope, is multi-faceted and has many refractions. I would like to limit my comments to several of these. First, I would like to touch on some energy policy issues, followed by some thoughts about technology and fuel choices and finally, to close with my views on the importance of carbon management efforts.

**ENERGY POLICY**

Generation after generation is striving to improve conditions for the better for those who will follow. Nationally and regionally, state by state, county by county we are engaged by ever improving the health and welfare of our citizens. While energy demand and consumption has steadily risen and continues to do so, the emissions of major sources have trended in the opposite direction. Environmental and energy frameworks, such as the Clean Air Act or the Green Star program, have been successful. Despite these and other achievements, further improvements can and should be pursued. We also need to address new potential problems as identified by scientific findings. To meet public health and environmental challenges, power plants, industrial sources, transportation and personal consumption must continue to strive to produce fewer potentially harmful emissions.

In light of international turmoil, price volatility and fuel dependence, there has been a reemphasis on the recognition of the value of all of our domestic resources. The current fuel mix, as it pertains specifically to electricity production, will not change within the near term. Coal, Nuclear and Gas are the primary producers, and given the right technological application, equally environmentally friendly. Alternative sources need to be developed for a myriad of reasons; however, the development and integration of alternative sources at this time has several more hurdles to clear prior to their full capabilities into our power supply systems.

The most recent comprehensive energy legislation that passed in Ohio (S.B.3) outlined the state policy objectives. Those included, among others, the following:

- Ensure the availability to consumers of adequate, reliable, safe, efficient, nondiscriminatory, and reasonably priced retail electric service;
- Ensure the availability of unbundled and comparable retail electric service that provides consumers with the supplier, price, terms, conditions, and quality options they elect to meet their respective needs; and,
- Ensure diversity of electricity supplies and suppliers; and
- Facilitate the state's effectiveness in the global economy.

Also worthy of note is the Mission Statement of the Ohio Power Siting Board.

*The mission of the Ohio Power Siting Board is to support  
sound energy policies that provide for the installation of*

*energy capacity and transmission infrastructure for the benefit of the Ohio citizens, promoting the state's economic interests, and protecting the environment and land use.*

Clearly, the Public Utilities Commission of Ohio and the Ohio Power Steering Board must reflect these objectives and mission in their everyday analysis and decision making processes. It is with that in mind, that I assure you, we have given this much thought and reflection.

Ohio is, in every way, a microcosm of our nation. The above mentioned fuel choices is no exception, representing Ohio's fuel mix. Ohio is a reflection of America's electricity production picture. Natural Gas has been the "advertised fuel of choice" for the past decade. This was due to having, on a heating value basis, fewer emissions than other fossil fuels. However, we have found it is saddled with economic constraints, as well as dependency issues. Nuclear electricity production has public perception as well as operational concerns. Coal has had a legacy of being the main culprit of public health problems. All of these points are true, but subtle differentiations and energy pathway projections do paint a different picture.

1973's oil embargo, the Iranian revolution of '78, the Iraqi invasion of Kuwait in 1990, and the current gasoline prices are making it abundantly clear that there is a direct link between energy supplies and U.S. economic vitality. Energy is much more than an essential commodity; it is woven into the very fabric of our society. Electricity is one of the essentials.

Nuclear energy contributes 20% of the U.S. electricity supply. Nuclear energy produces no greenhouse gas or other critical air emissions. This makes it essential to our air quality goals, as depicted in the Clean Air Act for example, and suitable for limited clean air constrained electric load regions. Spent fuel storage concerns coupled with public conceptions [**or perceptions**] in tandem with governmental constraints have made it difficult for this electricity supply resource to make significant advancements.

Natural gas is an inherently clean (based on production-grade emission potential /Btu content) fossil fuel. Residential and commercial use, including space heating, water heating, food, future feedstock in chemicals production and in process applications should not be taken lightly. The agricultural sector is the major user of natural gas based fertilizers allowing our citizens to enjoy plentiful food supplies. Natural gas has more recently been increasingly used to generate electricity. Competition on an open trading basis has shown dollar and cents responses to usage demands.

Coal contributes about 1/4th of the nation's primary energy production. Coal-based electricity generation is close to 67% nationally and 86% of Ohio's electricity supply. Coal is essential to our electricity supply but also to other industries such as the steel, lime, cement or chemical concerns. Coal remains as the most reliable and economical available energy and electricity resource for the nation. Current environmental stewardship by domestic electricity producers are demonstrating that concerns are being addressed and resolved effectively. However, more should, can, will be done to continue the quest for a near zero emission coal-based electric generating source.

### **Carbon Management/Sequestration**

Concerns of permanent climatic alterations by human behavior, such as the production of electricity, is postulated to follow from increasing emissions of carbon dioxide to the atmosphere attributable to the release by fossil fuel combustion. The debate over the validity of this

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In light of international turmoil, price volatility and fuel dependence, there has been a reemphasis on the recognition of the value of all of our domestic resources. The current fuel mix, as it pertains specifically to electricity production, will not change within the near term. Coal, Nuclear and Gas are the primary producers, and given the right technological application, equally environmentally friendly. Alternative sources need to be developed for a myriad of reasons; however, the development and integration of alternative sources at this time has several more hurdles to clear prior to their full capabilities into our power supply systems.

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hypothesis is not at issue. As a prominent politician stated, "we need an insurance policy, no matter what it, is good for all of us to preserve our grandchildren's future". Part of this policy is carbon sequestration. There is great potential to decrease atmospheric concentrations through biospheric and geological sequestration as well as the development and deployment of advanced power generation technologies. These potentials not only have local and regional perspectives, but will be applicable on a global scale. Ohio and its electric companies have demonstrated a significant commitment to carbon management by strongly supporting forestation and agricultural management efforts within the state as well as internationally.

These efforts include sensible siting of energy facilities in the development of delivery corridors with view of protecting local flora and fauna. The environmental impacts of electricity represent a considerable future challenge for local, state and federal agencies in the face of expected infrastructure need and electrical load growth. In addition, the electrical sector continues to be subjected to an uncertain set of new regulations for air quality, land use and restoration. At the same time, new markets in the power sector are transforming industries giving rise to solutions based on cooperative and coordinated efforts for many of the environmental issues.

### **Next Steps:**

In light of electricity market developments and their associated infrastructure needs I would like to offer some directional observations. A new cycle of baseload power supply has to be developed and deployed. This requires the most advanced technologies and construction methods ranging from improved steel development to membrane CO<sub>2</sub> separation or hot gas technologies for IGCC applications. Today's uncertainties surrounding the cost of large scale CO<sub>2</sub> capture and storage will become much more focused as a result of such efforts as the recently announced Future Gen project. I see this venue, project as one of the most promising and needed cooperative effort to advance our future electricity supply needs. Indeed coal gasification technology is the known potential to become a main pillar in a future "hydrogen economy". Ohio supports any efforts and is willing to contribute to such endeavors which will bring about such technology advancements that will provide our citizens with reliable, secure, affordable and environmentally responsible electricity supply.

At the same time, new markets in the power sector are transforming industries giving rise to solutions based on cooperation, coordination too many environmental issues. In closing I would offer the following recommendations in support of the Departments efforts which have the full support of Ohio stakeholders

- \* US DOE needs to work with the states to provide for a regional effort in the development of energy infrastructure.
- \* Technology development based on fuel specific characteristics should be at the core of the Departments charge.
- \* Funding for technology deployment is essential and should be approached as a three way endeavor...federal - state - industry.